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Postprint / Postprint

Zeitschriftenartikel / journal article

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## Empfohlene Zitierung / Suggested Citation:

Lehmkuhl, M. J. (2008). Congruency within rural social networks as an indicator of interpersonal influence on risk judgments: the great stir caused by BSE in a village in northern Germany. *Public Understanding of Science*, 17(4), 485-502. <https://doi.org/10.1177/0963662506075652>

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# **Congruency within rural social networks as an indicator of interpersonal influence on risk judgments: the great stir caused by BSE in a village in northern Germany**

**Markus J. Lehmkuhl**

In the following survey, congruency within a sample of 150 rural social networks ascertained by comparing independently gathered data is used as an indicator of interpersonal influence concerning BSE-related current knowledge and consumption habits. Our findings suggest that friends, relatives and acquaintances mutually orientated each other about what was worth knowing about BSE. Concerning the behavioral dimension of risk judgments, our findings indicate that social networks obtained within the village explored have activated collective resistance against fear. This is explained by the character of the risk source. Positive attitudes towards conventional farming obviously contributed to the social identity of villagers. The devaluation of conventional farming as a source of societal threat by the mass media touched on an integral part of the self-definitions of villagers and activated resistance within their social networks. It is argued that a central point in explaining the role of interpersonal influence in risk judgments is not only the dimension of risk judgments but the character of the risk source. If attitudes concerning a risk source contribute positively to one's identity, the devaluation of the risk source by mass media coverage may enhance the probability of collective resistance against fear.

## **1. Introduction**

Congruency or homogeneity within social networks is an extremely complex feature. The difficulties in dealing with it start with the effort of integrating this construct within the mass communication process. In the past, congruency in mass communication research has been treated mainly as a side condition of *the relation* between interpersonal and mass communication. With the proviso that small groups or social networks are characterized by high congruency with regard to values, predispositions and the like, the chances of mass communication becoming influential, for instance, on political votes have been classified as particularly low. In this context, the metaphor of the protective shield has been used: congruency within small groups and interpersonal relationships concerning political preferences and/or values screens recipients from media influence like a protective shield (Schenk, 1995: 64; 2002: 369).

This conceptualization and interpretation of congruency belongs to the tradition of channel-oriented research. Lazarsfeld and Katz can be regarded as the founders of this tradition. Lazarsfeld et al. (1944) detected during the US presidential election in 1940 that individuals tended to vote for the same candidate in groups. Lazarsfeld suggested that everyday conversations apparently influenced voters more strongly than did mass communication, "more than anything else people can move other people" (Lazarsfeld et al., 1944: 158). This study and others following it (Merton, 1957; Berelson et al., 1954; Katz and Lazarsfeld, 1955; Coleman et al., 1957; for a summary see Klapper, 1960) implemented the paradigm of limited media effects into mass communication research.

This branch of communication studies is characterized by the dualism of interpersonal communication on the one hand and mass communication on the other. Interpersonal communication was considered a limiting factor to the impact of the mass media. Klapper (1960) described and summarized this dualism in detail: he treated the influence of interpersonal communication as an intervening variable. Omitting this variable would result in a more direct impact of the media.

This conceptualization of interpersonal communication has been taken up repeatedly over time until today (see for instance Robinson, 1976/1977; Beinstein, 1977; Schenk, 1995, 2002; Dunwoody and Neuwirth, 1991; Schmitt-Beck, 1994, 2000). The question has been which channel under which circumstances for which constructs (attitudes, issue salience, risk assessments) is more influential. The basic assumption behind such conceptualization is a competitive relation between interpersonal and mass communication, which is expressed in summaries stating a "hierarchical order" of influence. The social influence on recipients is located on the top of this order (Berghaus, 1999).

The channel-oriented perspective has been criticized substantially due to the underlying assumption that both channels could be considered to be equivalent (Chaffee, 1986: 63). We can call two things equivalent when they are independent means to reach a goal. Under this precondition it makes sense to ask which means is better, faster, more efficient, and the like. It is useful, for instance, to compare a car and a bicycle: both are equivalent means to reach destinations. We can state that a car is faster than a bicycle under certain circumstances.

It has been shown repeatedly, both theoretically and empirically, that mass media and interpersonal communication are not equivalent, but mutually linked. Information conveyed by the mass media provokes everyday conversations, while interpersonal communication provokes what and how much is obtained from the media (Chaffee, 1986; Kepplinger and Martin, 1986; Früh and Schönbach, 1991; Voltmer et al., 1994; McDevitt and Chaffee, 2000). Given this relation, the question of which channel is more efficient resembles the attempt to decide which came first, the chicken or the egg. In cases when a subject has become prominent both in mass media and (therefore) in everyday conversations, a channel-oriented perspective becomes senseless.

The main problem in dealing with congruency consists not only, perhaps not even particularly, in its theoretical conceptualization, but also in the methodological consequences that a mutual linkage of both channels requires. Given a mutual link between mass communication and interpersonal communication, the former simultaneous use of congruency data and data of media use in linear models (Schmitt-Beck, 1994, 2000, 2003; Schenk, 1995) becomes questionable in situations where the investigation was aimed at the relationship between mass communication and interpersonal communication. Given high congruency within social networks concerning the decision to stop eating beef after the widely covered announcement of a bovine spongiform encephalopathy (BSE) infection, and given that the congruency within a regression model explains much more variance with regard to the decision made than mass media use does, how can we conclude on a protective shield at work that screens respondents

from media influence? Given a mutual link between interpersonal and mass communication and given high congruency, it would also be possible to assume a strong influence from the mass media, because information or advice conveyed by the mass media has become relevant and influential, especially ideas that are in line with preferences or predispositions shared by the members of social networks. Given a mutual link, it is also possible to assume that congruency reinforces the possibility that *certain* media messages have a chance of being influential. Hence, we argue that congruency can be an indicator for interpersonal influence, but owing to the mutual relation between interpersonal and mass communication it cannot be an indicator for the weakness of mass communication at all.

The earlier understanding of congruency becomes intelligible to a certain degree by the fact that empirical data about congruency are very rare. Assumptions about the degree of congruency are dominated by self-assessments of respondents in field surveys. These data are far from being reliable. It has been shown that respondents tend to overestimate the degree of congruency within their networks (Schmitt-Beck, 1994). Owing to the lack of data on the one hand and the difficulties of assessing how reliable these data are on the other, our knowledge about the degree of congruency within social networks is limited.

In one of the very few studies, Schenk (1995) ascertained high congruency within social networks concerning issue salience and opinions. The self-assessments of the respondents were collected independently using the snowball method. This study may illustrate how difficult the gathering of reliable data is. We are confronted with a very incomplete database. On average, the networks analyzed contained fewer than two (!) persons. Therefore the stated high congruency applies only to a small part of the networks. Additionally, it has to be argued that several months passed between interviewing ego and the alteri. This is a huge period of time when research aims at comparing features such as perceived issue salience, which must be assumed very changeable over time.

Hence, one problem we face in this study is how to gather reliable congruency data. The second one is how to integrate these data rationally when a mutual linkage between interpersonal and mass communication must be assumed.

## 2. Interpersonal influence in risk communication research

Individuals tend to adopt the views of their peers or social networks. On the basis of data about conformity within groups, Festinger (1968) explained this tendency in his theory of informal social communication with two dynamics: first, the need of individuals to maintain the position they have within their groups or to get access to groups they would like to belong to and second, the need to construct viable images of reality. Especially in cases where reality is empirically inaccessible, individuals needed the social support of their peers. In social psychology, for social influence, defined as a change of attitudes as a result of interpersonal communication, two kinds of influence are differentiated. The first case represents the normative (social) influence; the second case refers to informative (social) influence.

The magnitude of interpersonal influence is affected not only by the position within a group or a social network someone occupies. Former research suggested that some structural aspects of social networks, too, become relevant for the strength of interpersonal influence. Small groups or small clusters of people (cliques) connected through strong ties within social networks are supposed to be very influential. In the context of channel-oriented research, it has been expected that social networks as a result of social change will become more loosely knit, and it can be expected that consequently social influence decreases and because of that mass media influence increases (Schenk, 2002).

According to Beck (1992) one of the features of risks a modern society finds itself exposed to is that they are particularly open for social definition processes. This is mainly due to the fact that modern risks often cannot be experienced directly. Modern risks are usually entirely invisible. One cannot validate the threat empirically. In addition to this, the causes of risks deny personal experience. Hence, according to Beck, individuals must believe in causes science has identified: modern risks are completely theoretical.

Given the findings of Festinger and Beck, modern risk issues in general should be a suitable topic in communication research for the examination of the role interpersonal influence plays in regard to risk judgments. Surprisingly, interpersonal influence as one of the factors that might determine risk judgments was, unlike psychological variables, rarely the focus of research. If social factors such as interpersonal influence were addressed, these factors were analyzed in relation to the impact of mass communication influence (Tyler and Cook, 1984; Culbertson and Stempel, 1985; Dunwoody and Neuwirth, 1991; Coleman, 1993). In this respect, risk communication research is strongly influenced by the channel-oriented approach. The initial point for this conceptualization is the assumption that both channels have different impacts on different dimensions of risk judgments.

As in political communication studies, this tendency is expressed in settings where mass media variables (media use or media attention) and interpersonal variables are used in linear models as independent variables to explain different dimensions of risks judgments: societal or personal dimension; affective or cognitive dimension. The assumption behind such conceptualization is a functional difference between both sources of impact. It is suggested that depending on the dimension of risk judgment the impact of both channels could be different.

A good example to illustrate how interpersonal influence was conceptualized in the past is a study by Dunwoody and Neuwirth (1991). The study basically aimed at the difference between a cognitive dimension of risk judgments, referring, for example, to the probability of getting cancer, and an affective one, referring to the concern, worry or dread people feel about risks. Through explorative factor analysis the authors confirm the difference expected, using AIDS as an example, and try to find out which dimension was more influenced by the mass media (operationalized by use and attention). The findings suggest that the media influence the cognitive dimension more strongly than the affective one. Another example of this conceptualization is the attempts to identify different impacts on the societal or the personal risk dimension. Quite often this is examined using the perception of the risk of becoming a crime victim. Here it is stated, often referring to the impersonal impact theory by Tyler and Cook (1984), that mass media influence the societal dimension of risk judgments more strongly than the personal one. As far as I am aware, studies focused on the social influence of the behavioral dimension of risks have yet to be made.

Also, here the interpretations become questionable. Given that a risk issue is widely covered by the mass media and given that this coverage becomes relevant in everyday discourse, what do a significant impact of interpersonal communication (however conceptualized) and the absence of media influence mean? Can we really state in such a case that "mass media exert negligible influence" (Coleman, 1993: 613)? Given a mutual link, the interpretation that the media becomes influential *through* interpersonal communication would also be possible.

### 3. Approach of this study

This short critical review leads us to the approach of this explorative paper. Our aim is to use congruency within rural social networks as an indicator for interpersonal influence on getting

risk information/knowledge and risk behavior in a field survey. The study tries to respond to the following research questions:

- RQ 1: Which role does interpersonal influence play with regard to getting risk knowledge and to the behavioral dimension of risk judgments?
- RQ 2: What affects the magnitude of the interpersonal influence?
- RQ 3: What do the findings indicate with regard to the relationship between interpersonal and mass communication?

These questions will be answered by using the first case of mad cow disease (BSE) in a German-born cow in November 2000 as an example of a risk issue a modern society regularly finds itself exposed to. The choice of this issue can be justified by the fact that to answer our research questions an issue is needed that has been widely covered by the mass media and (therefore) has become an apt topic in everyday conversations.

BSE is an example of a food scandal that has led to serious consequences for the agricultural sector in Germany. After the first announcement of this bovine disease on 24 November 2000 the agricultural sector was thrown into a devastating crisis that was compared in some media to what followed Chernobyl in the nuclear energy sector. The first BSE case conquered the headlines for two months; more and more new BSE cases came to light after tests were conducted more frequently. By the end of March 2001, more than 50 new cases had been made public.

The extraordinary news value of this event is mainly attributable to features which in 1990 and 1996/7 also made the issue front page news in, amongst others, Germany and Britain (Kitzinger and Reilly, 1997; Jasanoff, 1997): since very little is known about the way the disease is transmitted, there is an incalculable risk that consumption of infected beef products might trigger the new variant of Creutzfeld–Jacob disease (nvCJD). As examples from Britain have shown, the disease develops in a terrible way and is terminal. Representative surveys suggest that in Germany the event accelerated public loss of confidence in the state's controlling and regulative power. Governmental action was suspected of being influenced by the interests of lobby groups (Hennen, 2002; Zwick and Renn, 2002).

Shortly after the mass media had reported the first case of BSE in Germany, many Germans reacted with a form of escapism: they abstained from eating beef—and the markets collapsed. In 2001, beef consumption in Germany decreased by 30 percent compared to 2000 (ZMP, 2006). Perhaps comparable to what had happened in Britain in 1996, from the appearance of the first infected cow on, BSE became a topic in everyday conversations, and a pressure resulted affecting virtually every citizen: everybody had to deal with the topic, had to get information, had to decide whether beef should still be part of everyday life (Jasanoff, 1997). This can be supported by our sample. In this survey 403 out of 404 respondents claimed to have talked about BSE within their social network.

Since the survey focuses on analyzing interpersonal influence by using independently gathered data, the possibility of questioning a representative group of individuals was ruled out from the beginning. Conducting a representative poll would have implied the use of the snowball method, which was impossible in the framework of this survey. This method leads to a considerable prolonging of the period in which data must be gathered (Schenk, 1995). This is problematic in the case of a poll aimed at comparing constructs such as risk behavior or current knowledge, which must be assumed to be very changeable over time.

In addition, it is very difficult to gather by-name network data without actively winning respondents over to participate. Former studies indicate (Schenk, 1995) that it is very important to gain the respondents' trust when very sensitive network data are to be collected. Germany is divided into several different areas, which have to be seen as very different

culturally, even in terms of language and/or accent. Gaining trust is particularly difficult if the cultural origin of the researcher responsible for the survey is different. As one of the key factors for the success of the survey the ability of the researcher to speak the regional language (low German) had to be seen. This is the main reason why Colnrade in northern Germany, situated 30 miles southwest of Bremen, was chosen in which to conduct a full-scale survey. The population was invited to a meeting just before the field survey started. In this meeting, in which 43 villagers participated, the method of gathering network data was presented—using partly low German—to make clear just how sensitive the data that the survey aimed at are. Additionally, announcements were made in the local press in which the researcher and supporters of the survey were introduced personally; for example the mayor and the chairs of local clubs were mentioned with supportive statements.

The village has 820 inhabitants, among them 632 aged above 16. The villagers were interviewed in the five weeks from 1 March 2001 to 7 April 2001. At that time, the subject of BSE had disappeared from the headlines for two weeks. Compared to German standards the village can be called remote. The neighboring small towns with approximately 10,000 inhabitants are 7.5 to 9 miles away. The remoteness of the village was considered vital, because this fact enhances the probability that data from a great proportion of all network members can be gathered.

There were 404 villagers interviewed. This equals a participation rate of 69.3 percent. Forty-nine persons were excluded in advance, either because they were absent during the survey period or because illness prevented them from participating. Among the 404 persons questioned, 333 (82.4 percent) were willing to mention their contacts by name. Considering the sensitivity of the data this quota can be regarded as a success. The names written down on the index cards enabled us to construct a “network map” of the village consisting of 150 different social networks with an average size of 6.5 persons. Thus, of all the persons who are in these networks, independently gathered data about their BSE-related knowledge and their consumption of beef have been made accessible for comparison. Of all 404 villagers interviewed, 304 respondents are a part of at least one of the 150 networks; 100 respondents do not belong to any of the networks.

This is due to the fact that our analysis of the networks was limited to those which are complete to a certain degree. Networks of which fewer than 50 percent of the members could be interviewed were excluded. It goes without saying that the 100 persons mentioned also have contacts to other villagers but—this is very interesting but not our topic here—their relations are limited to those villagers whose networks also consist of fewer than 50 percent villagers. That means that outsiders are connected with outsiders, insiders with insiders. Owing to our aim, the focus is limited to the insiders and their networks.

#### 4. Method

The use of congruency as an indicator for interpersonal influence in former studies leads to some methodological problems that have to be solved. Congruency of issue salience and opinions has been used by Schenk to support the thesis that social networks are influential with regard to the attitudes of their members, i.e. congruency has been used as an indicator for interpersonal influence without checking other possible causes for the congruency (Schenk, 1995). One of the possible causes of congruency is the homophily of the members of the networks—birds of a feather flock together.

The similarities of the members of social networks are problematic according to the interpretation of congruency data, if these similarities concern features that strongly influence

the variable in question. The educational level, for instance, usually strongly influences the level of current knowledge acquired from the media, especially when the infusion of mass media information is as high as in the case of BSE in Germany, a fact that contributes to the knowledge-gap hypothesis (Tichenor et al., 1970). Also, motivational variables such as issue salience or personal involvement influence the level of knowledge acquired from the media (Ettema and Kline, 1977). If networks are very homophilic regarding those variables and a high knowledge congruency was measured, we have to exclude arithmetically the effect of homophily on the measurement of congruency to make sure that it is really interpersonal influence that is responsible, and not similarities within networks.

Methodologically, this is possible by using not the original data, but the standardized residuals after calculating a regression, where in this example education and motivational variables are included as independent variables. If after that, the networks are still more congruent than would be expected by pure chance, we can conclude that something other than similarities in education and motivation must be responsible for the congruency within the networks.

This leads to another problem, which has become evident in one of the rare former studies where congruency data have been used. Schenk (1995) neglected to balance the congruency data used in that survey in hierarchical regressions with the probability with which a certain degree of congruency can be expected by pure chance. If 90 percent of a population decided to stop eating beef, an average congruency of 90 percent within social networks concerning this variable is not sufficient to conclude on social influence within networks. The congruency has to be qualified. This is possible by using the distribution of the feature in question among all members of the networks. In other words, the deviation of current knowledge about BSE and BSE-related consumption has to be checked first within the sample of the 304 persons who are in the networks and then the resulting deviation compared with the average deviation in all 150 networks. Only if the deviation within the networks is significantly lower than that expected by random sampling errors, can we assign an influence to interpersonal communication.

To sum up our methodological approach, the use of congruency as an indicator for interpersonal influence requires a stepwise methodological approach:

- We have to include a set of variables into regression equations which determine both variables of interest, current knowledge and BSE-related consumption habits, as much as possible.
- We have to exclude the similarities within the networks concerning these determinants by comparing not only the original data but also the standardized residuals.
- We have to balance the congruency data on the probability with which they have to be expected from random errors by using a t-test.

Before starting the presentation of our results, we will describe the indexing and distribution of the central variables of this survey.

## 5. Knowledge

Depending on the aims of research several different methods of gathering knowledge data were used (Wirth, 1997). Thus, the type of question reflects different representations of knowledge. With two exceptions in this survey multiple-choice questions were used. Questions with various answer options can be considered to be sufficient to represent the amount of knowledge respondents can recognize. That means that these types of questions basically refer to the selectivity with which respondents have picked up information. The



demands on respondents are supposed to be lower compared to recall questions, where a respondent has to answer unaided (Wirth, 1997).

Another category is the differentiation to whom knowledge is related (does it relate to me/does it relate to others) (Merten, 1990). This differentiation refers to one aspect of the structure of knowledge within a sample. It can be expected that the amount of knowledge in our case accessible in the village differs depending on the personal relevancy of a fact. The 14 questions can be divided into three fields of knowledge:

*The scientific core* of the problem without any reference to information relevant to the decision-making process. Two questions are aimed at the knowledge of the pathogen, one at the way the disease is passed on, and one at the scientific term for the disease.

*Non-scientific knowledge* without any reference to information relevant to the decision-making process. We wanted to find out to what extent people were interested in political measures to ensure protection from BSE.

*Information particularly relevant to decisions in consumption.* The seven questions in this set were meant to highlight the rational basis underlying risk decisions.

Our data confirm the expectation that, depending on the field, the amount of knowledge accessible for respondents is significantly different. The mean of correct answers differs considerably depending on the field of knowledge. While the mean of correct answers in both fields without direct relevance for respondents' decisions is around 50 percent, the mean in the other is 72 percent.

However, our data do not confirm the view that the village's knowledge about BSE is organized in the same way as the structure within the questions may indicate, because we failed to identify such a structure by using an explorative factor analysis. That means that we failed to replicate the designed dimensions of knowledge empirically. This is probably due to the fact that personal relevancy is a contingent dimension. Hence, a differentiated use of knowledge data is not possible in the framework of this survey. For use in regression models, the percentage of correct answers on all 14 questions was chosen. On average, 52.8 percent (SD 16.8) of the questions were answered correctly by the 404 villagers.

## 6. Change of consumption

The change of consumption related to the first case of BSE was to be measured by five questions. Categories involved in the behavior index are time (does the change still continue during the course of the survey) and the assumed range of the change. It certainly makes a difference if one stops eating meat completely and becomes a vegetarian or if one simply replaces beef with other kinds of meat. It was indexed as follows:

1. radical change (respondent becomes vegetarian)
2. strong change (respondent continues to refrain from eating beef and reduces the consumption of other meats)
3. moderate change (respondent continues to refrain from eating beef but does not eat fewer other meats than before)
4. weak change (respondent has refrained from eating beef only for a short time)
5. no change.

This leads to the distribution shown in Table 1.

**Table 1.** Change of consumption habits

Habits	Absolute	Percent
Radical change	5	1.3
Strong change	43	10.8
Moderate change	81	20.3
Weak change	53	13.3
No change	217	54.4
Total	399	100.0

## 7. Social network data

The lack of a unified practice of data collection hampers the research of social networks. The number of name generators used depends on the objectives of the particular set of questions. A standardized way of operating is far from being achieved (Jansen, 2006). In order to cope with the individual demands of the poll and at the same time to reach a certain comparability, this survey is oriented towards the four network generators applied in a representative survey conducted by Schenk (1995: 96 f.). (Schenk again refers to studies of Burt (1984, 1985) and Fischer (1982).) The generators aim at the dimensions of personal familiarity, conversations on BSE, social gathering, and—in allusion to the concept of opinion leadership—the phenomenon of the “informed acquaintance” (see Table 2).

In each question people were asked to write down the names of their personal contacts on an index card. Fifteen contacts were allowed as a maximum. Then we asked for information on the persons mentioned—age, educational degree, strength of ties, place of residence, farmer (yes/no). The number of contacts, the number of educational levels within the network and the number of different residences of the alteri were used to build a sum-index that expresses the *range of the social environment* in a satisfactory way (correlation between the index and the containing variables  $r = .86$  to  $r = .92$ ).

**Table 2.** Network generators

Question/name generator	Dimension	Network specifics
1. Thinking back to the past three months: with whom did you talk about things that mattered to you <i>personally</i> ?	Familiarity	strong relationships; core network
2. Now and again people talk to others about random subjects. How about BSE? To whom did you talk about this subject?	Interpersonal risk communication and opinion making	uni-/multiplexity of relationships
3. People get together for various activities like doing sports, being sociable, having a drink etc. How about you? Who did you socialize with recently?	Social activities	
4. Some people always seem to know what's going on in the world. How about your friends and acquaintances? Who is usually best-informed?	Sources of personal influence	Access to “experts” in circle of acquaintances

The result was an average network size of 10.9 persons. An important variable for assessing the structure of social relations is the geographical proximity. In the presence of a highly developed infrastructure—every villager has a telephone, in addition 65 percent have a cell phone, around 30 percent have access to the Internet, virtually every villager owns a car—human relations are principally no longer limited by geographical constraints. Nevertheless the findings indicate that geographical proximity obviously remains a key factor for the maintenance of human relations even in a highly industrialized society. It was found that 65.8 percent of the network partners live in the village itself. Only 5 percent of the network partners are located more than 30 miles away. That means that the 150 networks used for analyzing the congruency on average consist of approximately two-thirds of all members.

This leads us to another central variable of the survey: *the position* of a respondent within the network. It has been shown that the position of a respondent influences the probability that he/she adapts to the views of the group (Festinger et al., 1950; Newcomb, 1959). The closer a respondent is located to the edge of the group, the higher is his/her tendency to adapt to the views of his/her alteri. The construction of this variable can best be explained by using an example.

The network size of villager A contains 10 persons. The network size in this survey is not only based on the names written down by A on his index card. A only wrote down eight names; villagers B and C, not mentioned by A, wrote down A on their index cards. Thus, we class B and C within the network of A. Six out of the eight alteri who are on the index card of A wrote down the name of A on their index cards as well, two did not. In this example, we can state that 20 percent of the network of A consists of persons who have been mentioned only by A. We argue that the share of network partners that was based only on the statement of a villager can be used to assess his/her position within the network. The lower this share, the more central a villager is. In the example the share of alteri who have been mentioned only by A is quite low. That means A has to be regarded as a central figure.

*Multiplexity* is another central variable of this survey. This variable is generally important to answer the question of how specialized human relations are. In our context multiplexity helps us to assess whether specialized contacts (for instance to butchers, farmers, and the like) are of a certain relevance for the process of risk assessment concerning BSE, as a previous study suggests (Jasanoff, 1997). The multiplexity is derived from the four network generators. Basically, if each existing relation touches upon four network generators, such a grouping is defined as total multiplexity. A relation is totally multiplex if the person interviewed has talked about personal matters, about BSE with a contact mentioned, when the person has spent leisure time (common activities) with him/her, and considers him/her an informed acquaintance. In this survey, multiplexity is determined as a proportional value according to the total of existing relations:  $(\text{Number of multiplex relations} / \text{Maximum possible number of relations}) * 100$ .

## 8. Media use

It has been shown that the assumed amount of messages respondents received by the mass media influenced their risk assessments (Mazur, 1981, 1984; Wiegmann et al., 1990). Therefore, every villager was asked in detail about his/her *media use*. As a result, we got self-estimations of their daily amount of watching and reading. The average villager watches two and a half hours of television per day. Ninety percent of the 404 villagers regularly watch one daily news broadcast on television; 38 percent even watch two different news shows several times a week. For the use in regression models, we created a simple index that contains the number of watched news broadcasts within a week.

The average villager spends 34 minutes per day reading the daily paper. These estimates differ only slightly from those regularly collected for the whole of Germany. Newspaper use is dominated by regionally published newspapers: 86 percent of the villagers read one of the four regional newspapers at least once per week. Quality newspapers published nationwide are of no importance. Merely six villagers (1.5 percent) stated they read one of the five national papers regularly. Only the nationwide tabloid *Bild* is frequently read by 14.6 percent of the villagers. Weekly national papers and magazines (*Spiegel*, *Stern*, *Die Zeit*, *Die Woche*, *Focus*) are read frequently by 13 percent of the villagers. Here, too, simple indices have been used in regression models containing the number of newspapers, tabloids and magazines read within a week.

## 9. Results

Table 3 gives the results of two regression equations that examine the influence of a set of variables on the level of current knowledge and the BSE-related change of consumption. The conventionally used demographic variable gender had to be excluded from the equation owing to problems with multicollinearity. Gender is strongly linked with the responsibility for the household. We asked who usually buys meat and—not surprisingly—mostly women claimed to be responsible.

**Table 3.** Determinants of current knowledge and behavior

	Knowledge	Behavior	
	Beta	Beta	Tolerance
<i>Media use</i>			
Duration of TV use	.02	.05	.80
Number of news broadcasts (TV)	.02	-.08	.80
Duration of newspaper use	-.07	.02	.67
Number of daily newspapers	.04	-.03	.75
Number of tabloids	-.03	.08	.85
Number of political magazines	<b>.08<sup>†</sup></b>	.06	.89
<i>Social environment</i>			
Range	<b>.18**</b>	<b>-.09<sup>†</sup></b>	.76
Community involvement	.05	<b>.16**</b>	.93
<i>Salience</i>			
Issue salience	.07	<b>-.21**</b>	.94
Farmer	<b>.18**</b>	<b>.18**</b>	.93
Responsibility for household	-.07	-.07	.89
<i>Personal features</i>			
Informed acquaintance	<b>.18**</b>	.07	.89
Strength of personality	-.03	.06	.82
<i>Demography</i>			
Age	<b>.16**</b>	-.08	.61
Education	<b>.27**</b>	-.04	.65
R <sup>2</sup>	<b>.26**</b>	<b>.17**</b>	

<sup>†</sup> $p < .10$ ; \* $p < 0.05$ ; \*\* $p < 0.001$ .

Note: Entries are standardized betas.

The best predictor to explain the variance in *current knowledge* about the disease is education. The higher the formal degree, the more knowledge a respondent has. Another strong predictor is the dependency on farming. It is not surprising that a farmer is more interested in information about the disease than other people are. Also, significantly related is the character of the social environment of a respondent. The more contacts to different people a respondent has, the higher is the probability that he/she gets more knowledge about a current topic. Media use is poorly related to the amount of current knowledge. Worth mentioning is only the positive relation between the number of political magazines usually read by a respondent within a week. Also poorly related is the strength of personality (Noelle-Neumann, 2002: 96 ff.). This is surprising. We used ten self-assessments concerning personality developed by Noelle-Neumann to measure the strength of personality. People with strong personalities are assumed to be better informed than others about current topics. We cannot support this assumption. This might be due to the tendency of villagers towards understatement concerning personal matters.

A good amount of variance is explained by the fact that somebody can be called an informed acquaintance. If more than three villagers have called another person their informed acquaintance, we placed him/her in this category. As expected, the personal feature of such a person being generally more interested in current topics becomes obvious by their higher information level.

The best predictor to explain the variance concerning *the risk decision* is the perceived issue salience. The more salient the topic BSE is, the higher the probability that a respondent has stopped eating beef. This supports our view that the BSE-related behavior is an indicator for the risk assessment concerning BSE. It has been shown repeatedly that the higher the perceived salience of a risk topic is, the more a respondent feels at risk (Dunwoody and Peters, 1992). The character of the social environment also explains a fair amount of variance. Community involvement means the number of local clubs a respondent is a member of. This variable has been used to explain differences between personal and societal risk assessments (Park et al., 2001); here it could serve, together with the range of the social environment, as an indicator for how close a respondent feels towards the "cultural space" village. The closer this relation is assumed to be, the higher is the probability that a respondent does not feel highly at risk (see for an explanation Wildavsky, 1993, and the discussion below).

Our aim is not to explain all the relations found in detail. Our focus is on the measurement of interpersonal influence and our first step towards this aim was to identify important determinants concerning the constructs in question. In the following paragraphs we will look closely at the congruency within the 150 networks that have been identified.

## 10. Interpersonal influence

It has become well known that interpersonal influence is particularly strong with regard to attitudes (Chaffee, 1986; Schenk, 1995; Berghaus, 1999; Schmitt-Beck, 2000). Thus, we expect that the networks will be much more congruent than what would be expected due to random sampling errors, especially in the case of the decision to stop eating beef. Concerning acquiring current knowledge, it has been stated repeatedly that the contents stem directly from the media. Nevertheless, interpersonal communication has been assigned an important role. It enhances the probability that more current knowledge will be cognitively accessible (Veltmer et al., 1994). From this point of view it is vital that a respondent has talked, but it is not vital *with whom* exactly. We think that this view would be supported if we find that interpersonal influence concerning current knowledge is of no importance after controlling it for the set of variables of the regression equation, especially after controlling it for the influence of the social range.

Owing to the homophily within networks, we expect that the amount of congruency will be reduced when we compare the standardized residuals. Table 4 shows the resulting values by comparing the original data (first row) and the standardized residuals (second row) concerning the decision how to deal with beef after the first case of BSE in Germany. The standard deviation within the sample of the 304 respondents who are part of at least one of the 150 networks is 1.12. The mean of standard deviations of all 150 networks is 0.89. That means that the deviation within the networks is significantly lower than that expected by chance. As expected, the difference decreases by comparing the standardized residuals but is still highly significant. Thus, even by controlling the congruency by the similarities within the networks concerning the set of variables of the regression equation the networks remain more congruent than expected by chance.

Table 5 shows the results concerning the level of current knowledge. Here, we also find significant differences between the values that can be expected by chance and the values we found by comparing the gathered data. The standard deviation within all 304 villagers who are part of the networks is .17. Within the networks the average standard deviation is slightly but significantly lower (.15). The difference becomes considerably lower by comparing the standardized residuals, but, as in the case of the risk related behavior, it remains significant.

We think that the congruency data ascertained only slightly support the view that interpersonal influence is stronger concerning attitudes than concerning current knowledge. That the differences between the standardized residuals of knowledge were lower than those of risk related behavior might also be due to the fact that the amount of variance that has been explained by the regression equation is higher. To make the interpretation of the congruency data easier or even possible in terms of the role interpersonal influence played, an additional step of analysis is required.

It goes without saying that a high amount of congruency within a network of people who know only a few is hardly explainable by information exchange. Thus, to make sure that information exchange has played a certain role within the networks we have to expect at least that the degree of congruency within the network of a better informed villager is higher than that within a network of a worse informed villager. Additionally, it would be helpful to find indications that could explain which contacts could be regarded as particularly important, for instance those to local experts. In that case a relation between multiplexity and congruency can be expected. Also helpful would be a relation between the degree of activity in conversations and the congruency. As Table 6 shows no such a relation can be found.

**Table 4.** Congruency in social networks (average size 6.5 persons) concerning BSE related consumption ( $N = 150$ )

	Standard deviation ( $N = 304$ )	Mean of std. deviation within the networks	Difference	t-value
Value standard deviation	1.12	.89	-.23	-6.1**
Residuals	.98	.82	-.16	-5.5**

\*\* $p < 0.001$ .

**Table 5.** Congruency in social networks (average size 6.5 persons) concerning current knowledge ( $N = 150$ )

	Standard deviation ( $N = 304$ )	Mean of std. deviation within the networks	Difference	t-Value
Value standard deviation	.17	.15	.02	-5.2**
Residuals	.95	.89	.06	-2.8**

\*\* $p < 0.001$ .

**Table 6.** Determinants of interpersonal influence based on standard deviation of standardized residuals ( $N = 150$ )

	Knowledge- congruency	Behavior- congruency	
	Beta	Beta	Tolerance
<i>Network structure</i>			
Strong ties	.11	.11	.78
Multiplexity	.08	-.02	.87
Position	-.11	<b>.19*</b>	.86
Activity in conversations about BSE	.09	<b>.15<sup>†</sup></b>	.88
<i>Variable</i>			
Knowledge/behavior	-.06	<b>.26**</b>	.90
<i>Demography</i>			
Education	.12	-.07	.78
Age	-.16	-.14	.72
Gender (0: female; 1: male)	-.09	.08	.91
R <sup>2</sup>	.10*	.17*	

<sup>†</sup> $p < .10$ ; \* $p < 0.05$ ; \*\* $p < 0.001$ .

Note: Entries are standardized betas.

The relation between villagers' level of current knowledge and the congruency within their network is not only weak but also positive. The higher the level of knowledge is, the lower the congruency is. Also weak is the relation between the self-assessed proportion of conversations a villager claimed to have led very actively and the congruency. Unlike the level of knowledge the relation is at least positive. But nevertheless we have to state that we cannot find any indications that information exchange had played a role worth mentioning in explaining the differences of current knowledge.

Concerning the BSE-related behavior, the results enable us to make interpersonal influence responsible. The most obvious finding is that interpersonal influence is particularly strong in the networks of those who have the tendency to continue eating beef. The relation between behavior and the congruency is highly significant. Given all the uncertainties that can be called a general feature of all risks a modern society finds itself exposed to, the relation clearly indicates that the more risky a decision becomes, the more interpersonal support is obviously needed. That interpersonal communication can be assigned responsibility is additionally supported by the relation between the self-estimated activity in conversations and the congruency within the network. The higher the share of active conversations, the higher the congruency.

It has been argued that the individually perceived group attractiveness influenced the tendency to adapt to the views of the group (Festinger, 1968). We assumed that the different share of alteri within a network who have only been mentioned by ego reflects differences in group attractiveness. Thus, we think that our data support the view that the inner-group position of a respondent influences the probability that interpersonal communication becomes influential.

## 11. Discussion

In this paper, the risk topic of BSE in Germany has been chosen in order to look closely at interpersonal influence on risk decisions and knowledge. With respect to our last research question of what the results indicate with regard to the relation between mass communication and interpersonal communication, we found clear evidence that social factors reinforce media

effects concerning knowledge about BSE. This view can be supported primarily by the fact that the social range has a clear impact on the amount of knowledge someone receives about BSE from the media. The assessed amount of information someone has received is not as important as his/her connection to others for the explanation of differences concerning current knowledge about a topic that has been widely covered. To get current knowledge from the media in our case it was important to talk about the topic; it seems that conversations increase the probability that a respondent has more current knowledge cognitively accessible.

This effect has to differ from the effect interpersonal influence has. The relation between the social range and the level of knowledge can be explained by the dominance of the issue within the society. Especially those who are in contact with several people every day under these preconditions obviously had no chance to ignore the topic although they might have found the issue personally not relevant. This can be supported by the fact that the perceived issue salience surprisingly had no impact on the amount of knowledge someone received.

Interpersonal influence is defined as the change of attitudes, in the present study also as the change of knowledge, which is a result of an interaction with the attitudes of someone special who is connected with a respondent (van Avermeat, 2002). While the effect of social range can be explained also by the fact that the issue is dominant in society during the time of our survey, the results of our congruency data indicate, additionally, that it is not only relevant that someone is connected with a lot of people. To a certain degree, it is also relevant *with whom* somebody has talked.

We think that the congruency data can be explained by assumed differences in “network cultures” concerning the worth of being well-informed about current topics such as BSE. While the impact of the social range on the level of knowledge might be limited to those issues that are currently dominant in the media, the impact of interpersonal influence might also be relevant for issues that are not as widely covered as BSE was. Further research may clarify this.

We found no clear evidence that can explain the dynamics within the social networks concerning getting current knowledge in a coherent way. However, our data suggest at least that information exchange is not responsible for the effect. It seems that relatives, friends and acquaintances have mutually orientated each other with regard to what and how much is worth knowing about BSE. We think that this view may also be due to the fact that BSE was widely covered by the media. It is possible that information exchange may play a certain role when it comes to issues that are not as dominant as BSE was. In sum, our analysis only poorly supports the view that interpersonal influence is stronger concerning attitudes than current knowledge.

If we go one step further on the question of what these findings indicate with regard to the relation between influence in social networks and media impact concerning knowledge about the huge amount of topics covered every day, we can hypothesize that social networks reinforce informational effects and weaken them at the same time. Our results indicate that interpersonal influence in social networks reinforces selectivity.

Concerning the behavioral dimension of risk judgments on the topic of BSE, our findings indicate that social networks of the village explored have activated resistance against fear. This can be supported by the fact that interpersonal influence is particularly strong in the networks of respondents who decided to continue eating beef. It seems that such a “risky” decision needed more interpersonal support just to make sure that the decision is not as risky as it seems, counting up all the uncertainties that come to mind by reasoning about BSE information covered every day for more than two months by the mass media.

Our data further suggest that the risk decision itself is partly determined by the identification with the “cultural space” village. This is supported firstly by the positive relation between community involvement and the decision to continue eating beef, and secondly by the (poor) negative relation between the range of social environment and the risk decision.



The closer someone feels towards the cultural space village the less probable the change in consumption is. The risk source of conventional farming in the explored village has to be seen as a site of positive values. Attitudes concerning the risk source obviously contribute to what we can call the social identity of a villager, defined as "psychological connections achieved through the active processes of linking oneself to other people" (Walsh, 2004: 53), in this case to city dwellers. The devaluation of conventional farming as a source of societal danger therefore touches an integral part of the self-definitions of villagers and activated collective resistance within social networks.

This interpretation can be supported by the dynamics, as the analysis of the determinants of interpersonal influence suggests. That even normative influence played a role in explaining the extent of interpersonal influence suggests how valued the issue was. Also the fact that the share of active conversations is positively associated with the extent of influence in social networks supports this view.

What do the findings indicate with respect to the relation between the impact of mass media and interpersonal influence? In line with many findings about the role of mass media we can state that the coverage of risks at least leads to uncertainty, if not fear, by framing risks as societal problems (Altheide, 2002). This does not mean that mass media dramatize risks or sensationalize them—that is certainly not a typical feature of risk coverage (Dunwoody and Peters, 1992; Schanne, 1998; Bader, 1998). In our case this presumption suggests that mass media coverage about BSE caused the activation of collective resistance in some of the social networks against the devaluation of conventional farming as a source of risk, a source of anxiety.

These findings are limited to the village that has been explored. If we try to formulate hypotheses worth testing by further research about the role of interpersonal influence in risk judgments, a central point in explaining this role is not only, perhaps not even particularly, the dimension of risk judgments but the character of the risk source. If attitudes towards a risk source contribute to one's identity positively, the devaluation of the risk source by wide mass media coverage may enhance the probability of collective resistance against the fear within social networks.

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